The Nasdaq-100

Tracking Innovation in Large-Cap Growth

Introduction

On January 31, 1985, the Nasdaq-100 index (NDX) launched. Since that time, it has become one of the most widely followed stock indexes in the world. The Nasdaq-100 helps guide the investment community on general trends in share prices. Beyond this important informational role, the index has two primary objectives: 1) to focus investor attention on the index's 100 companies and, 2) to provide a basis for investable products. Today, we can say with confidence that Nasdaq has achieved these objectives with remarkable speed and success. Products tied to the Nasdaq-100 are now available in 31 countries, more than $200 billion of investments in exchange-traded products are tied to the index.

This paper will provide a broad overview of the Nasdaq-100, its methodology, its components and its spectacular success in generating tradable products.

General Overview

The Nasdaq-100 index was one of two that launched in 1985. One index was launched to focus on the financial companies listed on Nasdaq (Nasdaq Financial-100) and the other to focus on the non-financial companies (Nasdaq-100). These indexes were intended to serve as the basis for possible index futures contracts to be traded on the Chicago Board of Trade. At that time, interest was more centered on the financial companies listed on Nasdaq, so the initial focus was on the Nasdaq Financial-100. However, the non-financial Nasdaq-100 index has garnered the greater attention over the years, and while both indexes currently exist, this paper will deal only with the non-financial index.

The Nasdaq-100 should not be confused with the Nasdaq Composite index. The latter was launched in conjunction with the launch of the Nasdaq Stock Market in February 1971. The Composite is made up of all Nasdaq-listed common stocks, the number of which has varied substantially over the years.[1] Interestingly, it is the Nasdaq Composite—often referred to as "the Nasdaq"—that receives greater prominence in the media, alongside the Dow-Jones Industrial Index and the S&P 500. However, it is the Nasdaq-100 that has become the basis for investable products, a point that will be covered extensively in this paper.

Highlights

- Since its inception over 30 years ago, the Nasdaq-100 index has become the world's preeminent large-cap growth index.
- While the Nasdaq-100 is home to some of the most well-known names in technology— including Apple, Microsoft, Alphabet, Intel, NVIDIA, and Facebook—the index also includes category-defining companies on the forefront of innovation in other key industries such as Amgen, Starbucks, and Tesla.
- Since the introduction of index options in 1994, a wide assortment of financial products that track the Nasdaq-100 have been made available to investors.
- The Nasdaq-100 also serves as the basis for many investable securities, the largest being the Invesco QQQ ETF (Nasdaq: QQQ). The current value of this and related exchange-traded products exceeds $200 billion, making the Nasdaq-100 one of the most widely tracked indexes in the world.

At its inception, the Nasdaq-100 was designed as a market capitalization-weighted index.[2] This means that the importance or "weight" of a given component was proportional to its market cap (current price multiplied by total shares outstanding). The index was priced by continually updating the sum of the market caps of the 100 components and dividing this sum by a divisor. The divisor was set at launch so that the index had an initial value of 250, and was periodically updated to account for changes to the index composition in line with standard practice. At the end of 1993, the index was reset to one half its current value—in essence a two-for-one split. Thus, the split-adjusted initial value of the index is now 125.

In November 1998, in order to make the Nasdaq-100 suitable for the basis of an exchange-traded fund (ETF), the index weights were modified away from market cap weights in a special rebalance. These modifications were needed to ensure that the ETF would meet the diversification standards required by the IRS for registered investment companies. In May 2011, the index underwent a second special rebalance that resulted in the index share multipliers being set to one. Greater detail on the index's modified market cap method will be presented below.

As indicated by the index name, the companies are fixed in number to 100. The fundamental determinant of inclusion is that the issuer be a non-financial company listed on the Nasdaq Stock Market. Whether the issuer is domestic or foreign is not a factor.[3] Since inclusion is based on rankings tied to ever-changing market capitalization, the components are periodically reconstituted. In its early years, the addition and removal of components were carried out at various points. However, since 1998 the rebalancing has been carried out annually, on the third Friday in December. The additions and deletions are wholly determined by the market cap rankings. There is no committee making membership determinations, as is the case with other well-known indexes. Indeed, investors determine the membership of the Nasdaq-100.

The Nasdaq-100 employs a rebalancing buffering rule. This rule reduces the number of stocks going into and out of the indexes, thereby avoiding associated transactional costs of rebalancing. If, at the time of rebalance, the market cap of a component is ranked among the top 125 eligible components (not top 100), it will remain in the index for another year; preventing another company from entering. By the following year, the stock must be in the top 100 to remain in the index. In effect, components may be granted a one-year "probation" prior to being removed from the index.

Interim index component changes can occur between the annual December events. A component can be removed due to a corporate event such as a merger or a delisting. The market cap ranking of an eligible replacement is used to determine the additions. In the case of an initial public offering (IPO), a three-month "seasoning" period is required before the issue is eligible to be in the index. Neither large IPOs nor other new listings can join the index before the annual re-ranking, regardless of their market cap, unless there is an interim vacancy.

Since inception, the Nasdaq-100 has had 490 members. Some of these companies exited then later rejoined the index. Of the original members at launch, six are in the current index.[4] In recent years, between seven and 15 component changes have been made per year, and in the December 2020 rebalance, six components were changed.

In April 2014, Nasdaq changed its policy concerning the number of components. Traditionally, the index has been limited to 100 common-stock issues, with only one issue allowed per issuer. Now, the index is limited to 100 issuers, some of which may have multiple issues as index components. The most prominent current example involves Alphabet, which in spring 2014 essentially executed a two-for-one stock split by issuing a new class of common shares. Both issues are in the current index. At the December 2014 rebalance, all eligible issues from the top 100 issuers became fully represented in the index. As a result of the December 2019 rebalance, the current index contains 103 component stocks, representing 100 issuers.

Index Performance

It is useful to revisit the trajectory of the Nasdaq-100 over the past 30 years, which is represented in the following graph.

Nasdaq-100 Index: Launch to Present

The graph shows solid and steady growth from launch to 1995, when the index increased about 12% per year. This growth accelerated through the remainder of the 1990s to an astounding average rate in excess of 40% per year. The peak occurred on March 27, 2000, with an index value of 4705. During the next few years, the index fell as fast as it had grown, bottoming out at a value of 805 in October 2002.

After its October 2002 nadir, the index began a long recovery, but again suffered serious losses with the financial crisis of 2008, when it dropped to almost 1000. By 2011, these losses had been recovered. Since the start of 2012 the index has increased fairly steadily at an annual rate of about 21%. The index suffered a sharp selloff of 28% during the early months of Covid-19 pandemic in 2020. It quickly recovered and began consistently reaching new all-time highs starting late in the second quarter culminating in an all-time high at year-end 2020.

The Nature of The Index Components

Interest in the Nasdaq-100 index stems from the special nature of its components. This section reviews the characteristics of the components in a variety of dimensions.

Size

Today's Nasdaq-100 is rightly considered a large cap index. However, this was not always the case. It is interesting to look back at the market cap of the index's components over time. The aggregate market cap of Nasdaq-100 components at launch and at selected points in time is shown in the following table. Also in the table, for purposes of comparison, is the ratio of the Nasdaq-100 total market cap to the total market cap of all NYSE-listed domestic stocks.[5] This comparison allows one to see the remarkable relative growth in the size of the Nasdaq-100 components.

Aggregate market cap of the Nasdaq-100 Index Components

DATE	TOTAL NDX MKT CAP ($BILLIONS)	AS PCT OF TOTAL NYSE MKT CAP
Launch Feb 1985	$58	3.0%
Dec 1990	$109	4.0%
Dec 1995	$409	7.2%
Dec 2000	$2,218	19.4%
Dec 2005	$1,932	14.5%
Dec 2010	$2,498	18.7%
Dec 2015	$5,284	25.9%
Dec 2020	$14,721	51.5%

Since the index is made up of 100 companies, it is easy to calculate the average size of each company. At the 1985 launch, the average component size was only about $580 million, compared with a current value of about $138 billion; a more than 200-fold increase. In its early days, Nasdaq was in the process of moving beyond a trading utility for non-listed, over-the-counter (OTC) stocks into a distinctly recognized and branded stock market. Companies listed on Nasdaq tended to be either fairly new, or chose not to list on the New York Stock Exchange (NYSE) or American Stock Exchange (Amex). In any case, these companies were not large. Nasdaq's largest company, Intel, was relatively new (IPO in 1980) with a market cap of $3.5 billion. MCI was the second largest and Apple the third largest, with market caps of $2.3 billion and $1.8 billion, respectively. The smallest index components had market caps in the range of $200 million. (By contrast, the smallest issuers in the current index have market caps exceeding $12.8 billion.)

This situation would change in two fundamental ways, which can be seen by comparing changes in the market cap of the components with changes in the Nasdaq-100 index. From launch to the end of 1995, the aggregate market cap rose by a factor of 7.0. The price index, however, rose by a factor of 4.6 (125 to 576, split adjusted). The difference is a factor of 1.5, which is due to additional issuances of shares by existing components and by replacing larger companies for smaller ones at index rebalances. The early growth in the size of the Nasdaq-100 components is due to both pure price appreciation and these other factors. Since the end of the tech bubble, increases in the market cap of the index have been driven primarily by price appreciation, with the other factors only contributing about 2% to the growth in market cap.

The table indicates that, at launch, the total size of the Nasdaq-100 components was only about 3% of the value of NYSE-listed stocks. This percentage grew substantially during the 1990s, reaching 19% at the peak of the tech bubble. After falling during the 2000s, it has since rebounded to a level of about 48.8%, demonstrating from index launch to present, the size of the top 100 Nasdaq-listed stocks relative to the size of the entire NYSE list has grown by a factor greater than 16.

For reference, the current average size of the S&P 500 is $66 billion and the Dow Jones Industrial Average has an average size of $310 billion. To reiterate, the current average size of Nasdaq-100 is $153 billion. These data points help solidly establish the Nasdaq-100 as a large cap, though not a "mega cap," index.

Technology Orientation

The Nasdaq-100 is commonly viewed as a "technology" index. This section examines how this came to be, and specifically how technology stocks drove the evolution of the index and vice versa. The most reliable way to gauge this evolution is through the Industry Classification Benchmark (ICB) scheme for categorizing index components. Since the ICB system was not implemented until 2001, older Nasdaq-100 components were manually categorized into one of the 10 ICB top-level industries for the purposes of classification.

In 1985, Technology was the largest single ICB industry in the Nasdaq-100, but the 23 Technology components only made up 25% of the market cap of the index. Technology was followed by Consumer Services at 21% and Industrials at 15%. The largest stock was Intel, followed by Telecommunications firm MCI, then by Apple Computer. Other components of interest from the launch date include Adolph Coors, Chi Chi's Restaurants, HBO, Liz Claiborne, Mack Trucks, and McCormick Spices. These components illustrate the sector diversity of the Nasdaq list in the mid-1980s. The following table shows, for selected dates, the percentage of index weight made up by Technology stocks. Also shown is the second largest industry (and its corresponding weight).

Technology Weighting in the Nasdaq-100

DATE	INDEX WEIGHT IN TECHNOLOGY	NO. 2 INDUSTRY	NO. 2 WEIGHT
Launch 1985	25.1%	Consumer Services	20.6%
End 1990	30.6%	Consumer Services	18.8%
End 1995 (tech boom)	56.7%	Telecommunications	14.6%
Nov 1998 (modified mkt cap)	61.0%	Telecommunications	11.4%
Jan 2003 (market trough)	68.7%	Health Care	15.1%
Sept 2007 (market peak)	58.5%	Consumer Services	17.6%
Feb 2009 (market trough)	53.5%	Health Care	20.3%
May 2011 (special rebalance)	61.6%	Consumer Services	18.3%
Mar 2020	48.1%	Consumer Services	22.4%
Nov 2020	56.0%	Consumer Services	21.9%

At the dawn of the 1990s, the Technology weight had increased to 31%, and by the middle of the decade, when the tech boom was well underway, it was up to 57%. November 1998 is noteworthy for two reasons: the continued acceleration of the bull market and the special rebalance of index weights mentioned above. At that time, Technology stocks accounted for 70% of the market cap of the index. The rebalancing reduced that weight to 56%, the value shown in the table.

It is also important to note that the 1990s witnessed a boom in Telecom stocks, which represented a distant but solid second place in terms of index weightings.

The next part of the table presents weighting for the start of 2003, by which time the market bubble had fully disappeared. While the weight of Technology stocks remained high, the Telecommunications industry was represented by only two companies with combined weight of 2%. The largest casualty in the Telecommunications industry was WorldCom, though other telecom firms such as Global Crossing and Sycamore Networks saw much of their value disappear.

September 2007 indicated the market peak prior to the financial crisis. Also shown is the post-crisis trough in February 2009. During both periods, the index weight in technology stocks had declined somewhat from the peak, but still represented a clear majority of index weight.

May 2011 marked the special rebalance that restored the index back to market cap weights. At the rebalance, Technology represented 61.6% of market cap, a comparatively small increase from the 59.2% of the index weight prior to the rebalance.

The current index is still solidly technology weighted, led by issuers such as Apple, Microsoft, Alphabet, Intel, NVIDIA, and Facebook. Still, the Nasdaq-100 is by no means a pure technology index. In fact, the current technology weight is comparatively low by historical standards. The top non-technology components include:

- Biotech: Gilead Sciences, Amgen, Intuitive Surgical
- Retail: Amazon, Starbucks
- Media: Comcast, Netflix
- Industrials: Tesla

These components clearly represent growing, category-defining companies that are on the forefront of innovation in their respective industries.

Comparative Analysis Of Component Characteristics

In this section we compare the components of the Nasdaq-100 with those of two other widely followed indexes, the S&P 500 (SP500) and Dow-Jones Industrial Average (DJIA).

Industry

The technology orientation of the Nasdaq-100 was discussed above. It is interesting to contrast the complete industry breakdown for the three major indexes. The following table shows the breakdown of index weight into the 10 ICB Industries. Recall that the DJIA is price, not market cap weighted.

Breakdown of Industry Weight by ICB

INDUSTRY	NDX	SP-500	DJIA
Basic Materials	0.23%	1.92%	1.18%
Consumer Goods	9.11%	7.53%	7.22%
Consumer Services	21.91%	14.97%	18.51%
Financials	0.00%	15.29%	17.92%
Health Care	5.99%	12.80%	17.39%
Industrials	4.85%	11.97%	16.89%
Oil & Gas	0.00%	2.30%	1.94%
Technology	55.98%	28.52%	17.62%
Telecommunications	1.32%	1.81%	1.34%
Utilities	0.61%	2.89%	0.00%

Again, the Nasdaq-100 clearly stands out for its high Technology weighting. It is also heavily weighted in Consumer Services and Health Care, the latter being due primarily to the presence of bio-tech companies. Also noteworthy is what the Nasdaq-100 does not contain. Financials, of course, are not included by design, but they make up a substantial portion of the weight of the other indexes. In addition, there are no Utilities, Oil & Gas, and Basic Materials stocks in the Nasdaq-100.

Age

Nasdaq, itself a relatively new market, is generally thought of as the home for younger companies. The following table reinforces this point, and reflects the fact that the Nasdaq-100 (launched 1985) is comparatively a much newer index than the S&P 500 (1957) and the DJIA (1896). For each index component, the incorporation date was determined along with its weight within the index.[6] The table shows the percentiles of year of incorporation, weighted by the index weight. For example, 25% of the index weight for the Nasdaq-100 is from components incorporated before 1986. Half the index weight is from components incorporated after 1995, and 25% of the weight from companies incorporated after 2002.

Company Age

	PERCENTILES OF YEAR OF INCORPORATION		
INDEX	25TH	50TH	75TH
NDX	1986	1995	2002
SP500	1976	1992	2001
DJIA	1965	1983	1999

The table indicates that even the oldest of the Nasdaq-100 components are much younger than the older components of the other indexes.

Growth

Nasdaq also has a reputation as a home to growth-oriented companies. The following table shows summary statistics for the three-year average revenue growth of the index components.[7] Shown are both the index-weighted average growth rates, as well as the 25th and 75th percentiles of the average growth rates.

Three-Year Average Sales Growth Rates

	NDX	SP500	DJIA
Index Weighted Average	18.86%	11.27%	6.64%
25th Percentile	5.96%	3.23%	1.30%
75th Percentile	21.55%	12.13%	9.42%

The sales growth of the Nasdaq-100 components is much higher on average than that of the other indexes. The Nasdaq-100 contains 15 components whose sales growth has averaged more than 30% over the last three years. The DJIA has no components with this level of growth.

Dividend Yield

The dividend yield of a company is useful for measuring growth prospects. Companies with substantial internal growth opportunities tend to retain more earnings, paying little or no dividends. The following table shows the fraction of index components that currently pay a dividend, and the index-weighted dividend yield; including the companies with no dividend.[8]

Current Dividend Yields

	NDX	SP500	DJIA
Pct of Components with Dividend	50%	83%	97%
Weighted Div. Yield	0.71%	1.59%	2.06%

Only half of Nasdaq-100 index components pay dividends. By contrast, 29 of the 30 DJIA components do, as do 418 of the SP500 components (83%). Correspondingly, the aggregate dividend yield of the Nasdaq-100 is about half that of the DJIA. It is worth noting that while the dividend yield of the Nasdaq-100 is lower than that of the other indexes, it has been growing. For example, in 2004 the dividend yield was only 0.18%; one-fourth of today's level. It's fascinating to see how the total number of index's dividend payers has frown from just a few to 50 over the past 17 years.

Trends in Dividend Yields

YEAR	NDX	SP500	DJIAK
2003	0.18%	1.55%	1.98%
2004	0.24%	1.62%	1.97%
2005	0.51%	1.73%	2.04%
2010	0.62%	1.77%	2.43%
2015	1.12%	2.09%	2.52%
2020	0.71%	1.51%	2.00%

The top Nasdaq stocks, while solidly growth oriented, are in fact substantially more mature and profitable than they were at the height of the tech bubble, and far more likely to pay a dividend. Of note are Microsoft's special dividend in 2004 and the initiation of dividend payments by Apple in 2012.
Collectively, the comparative metrics shown above paint a consistent picture: the Nasdaq-100, compared to the other broad indexes, is much more oriented towards younger, growth-oriented companies, particularly technology companies. Indeed, the Nasdaq-100 may aptly be characterized as the world's leading large cap growth index.

The Nasdaq-100 As Basis For Tradable Products

As mentioned above, while the Nasdaq Composite index enjoys a higher profile in the media, the Nasdaq-100 is more widely used as the basis for tradable products. Indeed, the index has been specifically structured to promote the creation of tradable products. There are two reasons for this. First, the index has a comparatively small number of components, each of which is itself a highly liquid security (compared with indexes of 500 or 2000 components). Second, to meet IRS diversification standards, the weighting scheme uses an as-needed modified market cap approach to prevent a single stock or group of stocks from having too much weight.

Derivatives

The first product tied to the index was an index option contract introduced by the Chicago Board Options Exchange (CBOE) in February 1994. Under ticker symbol "NDX," this contract is cash-settled; the settlement value of the contract is $100 times the value of the index. A subsequent offering, the Mini-Nasdaq-100 index option (ticker "MNX") has a contract multiplier of $10.

The first tradeable option product tied to the index was the Nasdaq 100 Index Option, a cash settled option contract introduced to the marketplace in February 1994. Today, these contracts are traded under ticker symbol "NDX," and available on Nasdaq's option exchanges – Nasdaq Phlx, Nasdaq ISE, and Nasdaq GEMX.

Settlement of NDX options result in delivery of cash payment determined by calculating the difference between the final settlement value and the strike price of the option contract, and multiplied by $100. NDX options are European style in nature and can only be exercised on their expiration date. Trading of NDX Options will ordinarily cease on the business day preceding the day on which the settlement value is calculated, known as the Expiry date.

The Exchange opens for trading NDX options with Weekly, Monthly, and LEAP (up to 60 months) expiries.

Futures contracts based on the Nasdaq-100 were introduced on the Chicago Mercantile Exchange (CME) in April 1996 under ticker symbol "ND."[9] The size of the contract was set at $100 times the value of the index. In June 1999, the CME introduced the "E-Mini" contract on the index (ticker "NQ"), which was traded exclusively on the Globex electronic system, and which had a smaller contract value of $20 times the index. In addition to the futures contracts, the CME also offers options on the futures.

In terms of current activity, it is interesting to note the full-size NDX contract (multiplier $100) has the vast majority of volume among index options, while for index futures, it is the E-Mini contract (multiplier $20) that has the majority of volume. For both types of instruments, the Nasdaq-100 contracts are among the most actively traded products.

Average daily volumes for October 2017 are shown in the following table, which includes the top five contracts for the indicated type of derivative instruments. Though far below those based on the S&P 500, derivatives tied to the Nasdaq-100 are among the top traded index-based products.

Oct 2017 YTD Avg Daily Volumes: Top Five Derivatives Contracts

Equity Index Options		Equity Index Futures	
S&P 500 (SPY)	1,174,047	E-Mini S&P 500	1,985,628
S&P Volatility (VIX)	463,079	MICRO E-MINI S&P500	896,476
Mini S&P 500 (XSP)	35,456	MICRO E-MINI NASDAQ 100	705,657
Russell 2000 (RUT)	31,384	E-MINI NASDAQ 100	579,909
Nasdaq 100 (NDX)	11,460	E-mini ($5) Dow	234,671

Modified Market Cap Methodology

In the late 1990s, Nasdaq began to consider the possibility of developing an exchange-traded fund (ETF) patterned after the successful SPDR S&P 500 ETF that was launched in 1993. In the case of the Nasdaq-100, however, a special circumstance arose. Under IRS rules, a registered investment company (RIC) must exhibit a certain level of diversification in order to qualify for the tax pass-through provisions common to RICs. Given the growth in valuations during the tech boom of the 1990s, the Nasdaq-100 was at risk of not meeting

these diversification rules, due primarily to the high valuations of Microsoft and Intel.

As a result, Nasdaq developed a methodology for adjusting index weights in order to ensure compliance with IRS RIC diversification rules. The methodology is used to ensure that both of the following conditions are met:

- The largest stock has less than 24% of the total index weight, and
- The cumulative weight of all stocks with weight over 4.5% is less than 48%.

These conditions are more restrictive than the IRS rules, meaning that ETFs based on the index comfortably meet the IRS conditions. In early November 1998, Microsoft's weight was 22.3%. There were five stocks with weight greater than 4.5% and their cumulative weight was 60%. The new method was therefore implemented starting on November 4, 1998. After implementation, Microsoft's weight was reduced to 14.6%, and the cumulative weight of the top five stocks was reduced to 40%. These changes paved the way for the launch of the Nasdaq-100 ETF the following spring, in March 1999.

The methodology works by replacing a component's total shares outstanding (TSO) with a new quantity, termed the Depositary Receipt Multiplier (DRM). All index calculations and adjustments would be the same, except that DRMs would be used instead of TSOs. Larger stocks would receive DRMs less than their TSOs, while smaller stocks would have the reverse, DRM exceeding TSO. Since the index contained 100 components, a weight of 1% is a natural focal point—stocks with TSO-based weights greater than 1% are deemed "large," those with weights less than 1% are deemed "small."

As the market worked through multiple cycles, the relative valuation of the companies within the index had changed significantly. Therefore, a second special rebalance was implemented to reset the modified market capitalization weights. As a result of this special rebalance, which went into effect on May 2, 2011, DRMs were set to be equal to TSOs. Should the need arise, Nasdaq can alter DRMs away from TSOs to maintain appropriate levels of diversification.

Launch of QQQ ETF

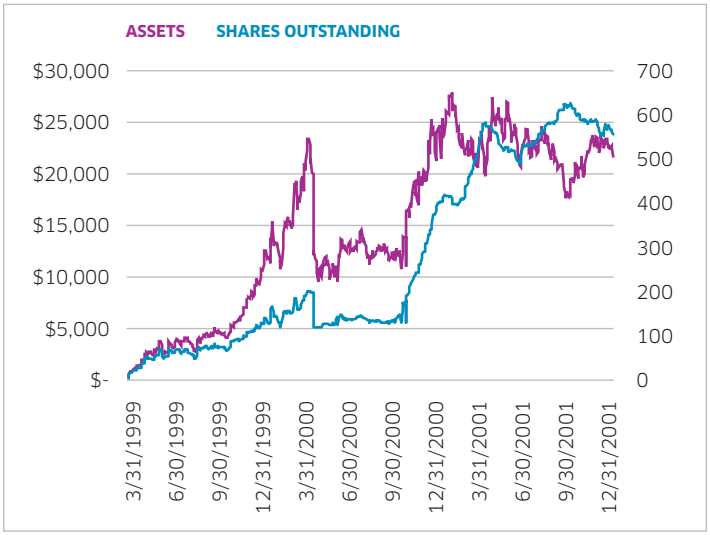
With the modified market cap methodology in place, an ETF tied to the index was introduced in March 1999. At launch, the ETF had ticker symbol QQQ, and was listed on the American Stock Exchange.[10] This listing venue was chosen for two reasons. First, the Amex had already listed the path-breaking ETF that tracked the S&P 500 (SPY). Second, at the time, Amex was part of a NASD subsidiary that included both Amex and the Nasdaq Stock Market.

While the Nasdaq Stock Market served as the initial ETF sponsor, this role would be transferred to Invesco PowerShares in 2007. As is the case with the SPDR S&P 500 ETF, QQQ employs a system by which shares could be created or redeemed by authorized participants. Arbitrage opportunities would ensure that the ETF tracks the index. The ETF experienced astonishing growth during its first few months of operation, a signal of the demand for this particular product as well as a harbinger of the forthcoming explosive growth in the number of exchange-traded products.

On March 10, 1999, QQQ was launched with a per-share net asset value of about $100. At the close of that day, the fund had about $15 million in assets. By the end of March that figure had risen to $658 million. Fund assets surpassed $1 billion by the mid-April, and $2 billion by mid-August. By the time of the market peak in March 2000, fund assets reached $10 billion. The ETF did a two-for-one split at that time, an interesting irony in light of the forthcoming market drop.

The following chart shows the shares outstanding and market value of the fund from launch through the end of 2001.

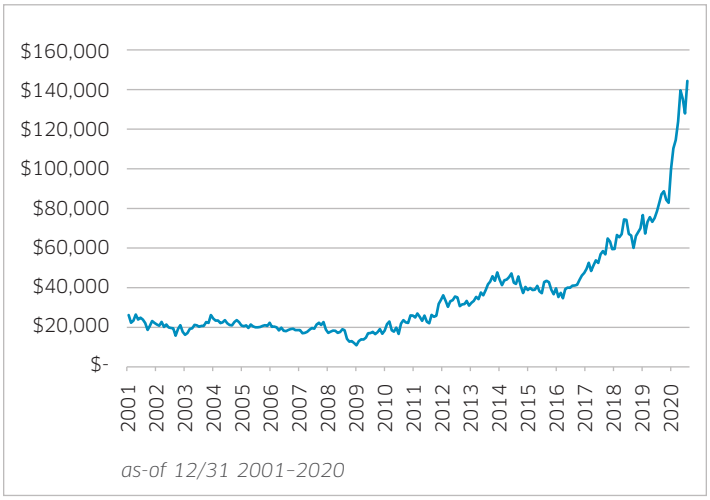
Market Value and Shares Outstanding of QQQ Launch to End of 2001



The remarkable growth of the fund between fall 2000 through spring 2001, in spite of the market meltdown occurring at the time, is demonstrated in the graph. It is reasonable to conjecture that the demand from investors for the ETF was far beyond that as a buy-and-hold investment vehicle. The ETF ended up being used as a hedging or speculation vehicle for traders wanting exposure to "tech" stocks. Evidence of this can be seen by looking at the "turnover" or "velocity" of trading, defined as the average daily dollar value of trading divided by the value of the fund. From September 2000 through April 2001, the daily turnover of the ETF averaged about 17%, an astonishingly high number for a single security. (By comparison, the daily turnover of the most active common stocks may average only 1-2%.) It is clear that QQQ, as has been the case for some other ETFs, has become a useful trading vehicle as well as investment vehicle.

The value of QQQ from 2001 forward is shown in the following chart. It was remarkably consistent at around $20 billion for most of the decade of the 2000s, until the bear market of the financial crisis. In early 2009 it fell to a low of $10 billion, but since that time it has increased more than 13 times to its current value of about $15 billion at the end of 2020. This increase is mostly driven by changes in market value (factor of 10.0 increase), with a negligent change in the number of shares.[11]

Value of QQQ Fund: 2001 – Dec 2020



Currently, QQQ is among the largest and most liquid ETFs, as indicated by the following table.

Top 10 ETFs by Market Value: Oct 2017 YTD Daily Averages

ETF	Avg Mkt Value ($M)	Avg Share Volume (M)	Avg Turnover
SPDR S&P 500 (SPY)	288,398	100.23	10.7%
iShares Core S&P 500 (IVV)	204,502	5.54	0.8%
Vanguard Total Stock Mkt (VTI)	152,249	4.71	0.5%
Vanugard S&P 500 (VOO)	148,663	4.70	0.9%
Invesco QQQ (QQQ)	115,604	46.58	9.8%
iShares Core US Aggregate Bond (AGG)	76,502	6.42	1.0%
Vanguard FTSE Developed Mkts (VEA)	73,920	14.91	0.8%
iShares Core MSCI EAFE (IEFA)	69,732	12.04	1.0%
SPDR Gold Shares (GLD)	64,460	12.28	3.2%
Vanguard FTSE Emerging Mkts (VWO)	60,151	15.39	1.0%

The size and turnover of QQQ, compared with that of other ETFs, again point to its dual role as an investment and trading vehicle. For example, both Vanguard Total Market (VTI) and iShares Core S&P 500 (IVV) have higher market value than QQQ, but trade far less. Regarding turnover, it is interesting to note that during November 2020 the average turnover of the Nasdaq-100 components was about 1%. Thus, the turnover of QQQ is close to 10 times that of its components.

The success of QQQ has spawned the development of other securities. For example, in the exchange-listed options arena, options on QQQ are among the most actively traded equity options contracts. The most active five equity option classes for 2020 are shown as follows:

Top Five Most Active Exchange-Listed Equity Options

Underlying	Average Volume
SPDR S&P 500 (SPY)	4,063,033
Apple (AAPL)	1,131,936
Powershares QQQ (QQQ)	892,429
Tesla (TSLA)	687,029
iShares Russell 2000 (IWM)	549,832

The options on QQQ have a much higher average daily volume than the NDX index option and have grown to have substantially more volume from a notional perspective as well (in 2020 the average notional value was almost twice as high for QQQ options the NDX options, a contrast from years prior). The NDX option had ADV of 12,300 contracts in 2020, each of which has notional value of 100 times the level of the index, which ended the year at a current all-time high of 12,888. The QQQ option had ADV of 980,000 contracts in 2020, also has a multiplier of 100, but the value of QQQ ended 2020 at $313.74. Overall, the 2020 average notional volume of the NDX and QQQ options were $12.7B and $24.8B, respectively

The success of QQQ has spawned the creation of similar exchange-traded products.

There were 73 ETPs globally tracking Nasdaq-100 Indexes as of December 31, 2020, with just under $200B in assets (of which $152B was in QQQ and over $47B was in all other ETPs).

These ETPs differ from the QQQ in a number of dimensions:

- Leverage and direction (examples ProShares TQQQ with +3x leverage and SQQQ with -3x leverage);
- Currency-hedged (example iShares XQQ hedged against the Canadian Dollar)
- Alternative weighting (example First Trust Nasdaq-100 Equal Weight (QQEW)
- Listed in alternative geographies: QQQ-like products licensed in 12 countries outside of the United States (example Guotai Nasdaq-100 in China)
- Specific sectors (example First Trust Nasdaq-100 ex-Technology (QQXT))

Summary

Over thirty years ago, Nasdaq set out to create a liquid, tradable version of the Nasdaq Composite Index for use in the financial markets. The Nasdaq-100 index, made up of the top 100, non-financial companies listed on the Nasdaq Stock Market, has since become the world's preeminent large cap growth index. In addition to serving as an indicator of the value of its components, the index has been highly successful as the basis for tradable products. With offerings in 31 countries worldwide, and exchange-traded products having value of $200 billion, it is clear that Nasdaq has succeeded spectacularly in its mission.

Endnotes

1. For more information on the Nasdaq Composite Index, see the white paper. https://indexes.Nasdaqomx.com/IndexBlog/Post/ Nasdaq-Composite-How-Today's-4000-is-Different-from-1999.
2. A complete discussion of the index methodology for the Nasdaq-100 is available on the Nasdaq index website: https://indexes.Nasdaqomx.com/docs/methodology_NDX.pdf.
3. There are a number of additional technical requirements that each component must satisfy. For example, each issue must have average daily volume of 200,000 shares per day or more. In addition, its index weight must be greater than 0.1%.
4. The seven are Apple, Micron Technology, Intel, KLA-Tencor, PACCAR, and Costco. Costco is on this list because of the index membership of Price Club, one of the companies that merged to create the current Costco. Of this group, Apple, Intel, PACCAR and Costco/Price Club have been index members continuously during the entire 30-year period.
5. Source: Bloomberg
6. Source Bloomberg. It is worth noting that the date of incorporation may be reflective of recent corporate actions such as mergers or restructuring. Therefore, the date of incorporation may be much later than the founding date of the parent company. A good example is Visa, the youngest company in the DJIA. Though the parent company was founded in 1958, the current company, formed from four geographical divisions, was incorporated in 2007.
7. Source of revenue growth rates: Bloomberg.
8. Dividend yield sources: Bloomberg, FactSet.
9. ND futures closed June 2015.
10. The QQQ transferred its listing to the Nasdaq Stock Market in November 2004. At that time, ticker symbols on Nasdaq had four characters, so the ticker changed to QQQQ. The ticker reverted back to QQQ in March 2011 following a change in symbology practices, allowing Nasdaq to have tickers less than four characters.
11. Figures mentioned here utilize average shares outstanding and AUM for QQQ from 2009 and November 2020 in order to calculate these observations.
12. All data is through 11/30/2020, unless otherwise indicated.

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